WHAT IS CLAIMED IS:

1. A method of transmitting a data block having a smallest peak-to-average power ratio (PAPR) in a selective mapping (SLM) scheme for PAPR reduction in an orthogonal frequency division multiplexing (OFDM) transmitter that transmits data using multiple carriers, the method comprising the steps of:

duplicating an input symbol sequence to a plurality of data blocks;

generating phase-rotated data blocks by multiplying the plurality of data blocks by different phase sequences;

inserting side information for identifying the phase-rotated data blocks into a predetermined position of the phase-rotated data blocks ;

performing inverse fast Fourier transform (IFFT) on the phase-rotated data blocks containing the side information; and

selecting a data block having the smallest PAPR among the inverse fast Fourier transformed data blocks.

2. The method of claim 1, wherein the side information for each of the phase-rotated data blocks is an index indicating the phase sequence multiplied for the phase-rotated data block.

3. The method of claim 2, wherein the side information includes $\log_2 U$ bits to distinguish U phase sequences.

4. The method of claim 1, wherein the side information is inserted into a front portion of each of the phase-rotated data blocks containing a plurality of bits.

5. The method of claim 1, wherein the side information is inserted into an end portion of each of the phase-rotated data blocks containing a plurality of bits.

6. The method of claim 1, wherein the phase sequences are one of Shapiro-Rudin phase sequences, pseudo-random phase sequences, and Newman phase sequences.

7. A method of receiving a data block having a smallest peak-to-average power ratio (PAPR) in a selective mapping (SLM) scheme for PAPR reduction in an orthogonal frequency division multiplexing (OFDM) communication system that transmits data using multiple carriers, the method comprising the steps of:

performing fast Fourier transform (FFT) on symbol data received on the multiple carriers, and outputting a data block comprising the FFT symbols;

detecting side information from a predetermined position of the data block; and

generating an inversion of a phase sequence corresponding to the detected side information and multiplying the data block by the inverted phase sequence.

8. The method of claim 7, further comprising the step of removing the side information after multiplying the data blocks by the inverted phase sequence.

9. The method of claim 7, further comprising the step of removing the side information before multiplying the data blocks by the inverted phase sequence.

10. The method of claim 7, wherein the side information is an index indicating the phase sequence.

11. The method of claim 10, wherein the side information includes $\log_2 U$ bits to distinguish U phase sequences.

12. The method of claim 7, wherein the side information is inserted in a front portion of the data block.

13. The method of claim 7, wherein the side information is inserted in an end portion of the FFT data blocks.

14. The method of claim 7, wherein the phase sequence is one of a Shapiro-Rudin phase sequence, a pseudo-random phase sequence, and a Newman phase sequence.

15. An apparatus for transmitting a data block having a smallest peak-to-average power ratio (PAPR) in a selective mapping (SLM) scheme for PAPR reduction in an orthogonal frequency division multiplexing (OFDM) transmitter that transmits data using multiple carriers, the apparatus comprising:

a distributor for duplicating an input symbol sequence to a plurality of data blocks;

a phase sequence and side information generator for generating different phase sequences for the plurality of data blocks and side information matching each of the phase sequences, for identifying the respective phase sequences;

a multiplier for generating phase-rotated data blocks by multiplying the plurality of data blocks by the phase sequences;

a side information inserter for inserting the side information for identifying the phase-rotated data blocks into a predetermined position of the phase-rotated data blocks;

an inverse fast Fourier transform (IFFT) unit for performing IFFT on the phase-rotated data blocks containing the side information; and

a selector for selecting a data block having the smallest PAPR among the inverse fast Fourier transformed data blocks.

16. The apparatus of claim 15, wherein the side information for each of the phase-rotated data blocks is an index indicating the phase sequence multiplied for the phase-rotated data block.

17. The apparatus of claim 16, wherein the side information includes $\log_2 U$ bits to distinguish U phase sequences.

18. The apparatus of claim 15, wherein the side information is inserted into a front portion of each of the phase-rotated data blocks containing a plurality of bits.

19. The apparatus of claim 15, wherein the side information is inserted into an end portion of each of the phase-rotated data blocks containing a plurality of bits.

20. The apparatus of claim 15, wherein the phase sequences are one of Shapiro-Rudin phase sequences, pseudo-random phase sequences, and Newman phase sequences.

21. An apparatus for receiving a data block having a smallest peak-to-average power ratio (PAPR) in a selective mapping (SLM) scheme for PAPR reduction in an orthogonal frequency division multiplexing (OFDM) communication system that transmits data using multiple carriers, the apparatus comprising:

a fast Fourier transform (FFT) unit for performing FFT on symbol data received on the multiple carriers, and outputting a data block comprising the FFT symbols;;

a side information detector for detecting side information from a

predetermined position of the data block; and

a phase sequence generator for generating an inversion of a phase sequence corresponding to the detected side information and multiplying the data block by the inverted phase sequence.

22. The apparatus of claim 21, further comprising a side information remover for removing the side information from the FFT data blocks multiplied by the inverted phase sequence.

23. The apparatus of claim 21, further comprising a side information remover for removing the side information from the FFT data blocks.

24. The apparatus of claim 21, wherein the side information is an index indicating the phase sequence.

25. The apparatus of claim 24, wherein the side information includes $\log_2 U$ bits to distinguish U phase sequences.

26. The apparatus of claim 21, wherein the side information is inserted in a front portion of the FFT data blocks containing a plurality of bits.

27. The apparatus of claim 21, wherein the side information is inserted in an end portion of the FFT data blocks containing a plurality of bits.

28. The apparatus of claim 21, wherein the phase sequence is one of a Shapiro-Rudin phase sequence, a pseudo-random phase sequence, and a Newman phase sequence.